

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
29 August 2002 (29.08.2002)

PCT

(10) International Publication Number  
**WO 02/066774 A1**

(51) International Patent Classification<sup>7</sup>: **E05B 63/20**

**Juha** [FI/FI]; Rantamutalantie 87 F 56, FIN-80160 Joensuu (FI).

(21) International Application Number: PCT/FI02/00039

(22) International Filing Date: 18 January 2002 (18.01.2002)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
20010160 26 January 2001 (26.01.2001) FI

(71) Applicant (for all designated States except US): **ABLOY OY** [FI/FI]; Wahlforssinkatu 20, FIN-80100 Joensuu (FI).

(74) Agent: **AWEK INDUSTRIAL PATENTS LTD OY**; P.O.Box 230, (John Stenbergin rantaa 2), FIN-00101 Helsinki (FI).

(81) Designated States (*national*): AE, AG, AL, AM, AT (utility model), AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ (utility model), DE (utility model), DK (utility model), DM, DZ, EC, EE (utility model), ES, FI (utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK (utility model), SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

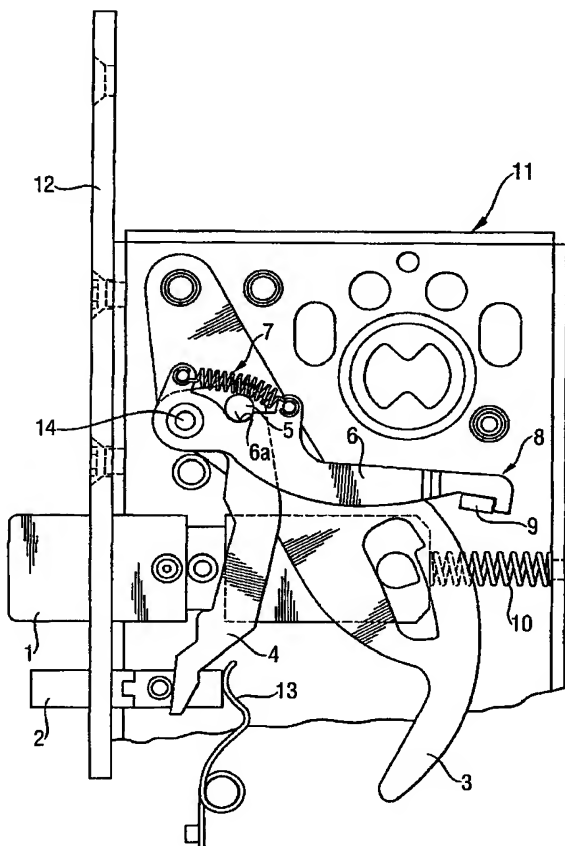
(72) Inventor; and

(75) Inventor/Applicant (for US only): **RAATIKAINEN,**

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),

[Continued on next page]

(54) Title: CONTROL ARRANGEMENT FOR A LATCH BOLT IN A DOOR LOCK



(57) Abstract: An arrangement for controlling the protruding dimension of a latch bolt (1) in a door lock which includes a lock case (11) which is provided with force transmission means for retracting the latch bolt (1) against the force of a spring (10) and with an auxiliary bolt (2) for controlling the operation of the latch bolt and in which the latch bolt (1) has at least two different protruding positions with different protruding dimensions. The arrangement includes a control and retraction unit (4,6) which is arranged in cooperation with the latch bolt (1) and the auxiliary bolt (2) so that it allows movement of the latch bolt (1) into its outermost protruding position only in case both the latch bolt (1) and the auxiliary bolt (2) are first moved into their retracted position in the lock case (11).

WO 02/066774 A1



Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR,  
GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent  
(BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR,  
NE, SN, TD, TG).

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

**Published:**

— *with international search report*

## CONTROL ARRANGEMENT FOR A LATCH BOLT IN A DOOR LOCK

The invention relates to an arrangement in a door lock for controlling the extent of protrusion of a latch bolt out from a lock case of the door lock in accordance with the preamble of claim 1.

In door locks provided with a latch bolt two different protruding positions with different extent of protrusion may be arranged for the latch bolt. In the first position the door can be pressed to be closed whereby the bevelled surface of the latch bolt hits a striking plate in the doorframe, which presses the latch bolt against its spring inside the lock. The outermost position of the latch bolt is intended for the actual locking of the door and in this position of the latch bolt the door cannot be pressed to be closed as described above. In this case the lock includes also an auxiliary bolt the purpose of which is to prevent movement of the latch bolt into its outermost position when the door is open, and on the other hand to allow the latch bolt to move into its outermost position urged by its spring after the door is pressed closed.

However, a malfunction may occur in the lock type described above so that when the auxiliary bolt is by accident pressed in when the door is open, the latch bolt is simultaneously released into its outermost position and thus prevents closing of the door by pressing. An aim of the invention is to provide a solution with which the mentioned malfunction can be eliminated.

25

The aim of the invention can be met as is disclosed in claim 1 and in the other claims. The arrangement according to the invention includes a control and retraction unit which is arranged in cooperation with the latch bolt and the auxiliary bolt so that it allows movement of the latch bolt into its outermost protruding position only in case both the latch bolt and the auxiliary bolt are first moved into their retracted position in the lock case. Thus, since movement of the latch bolt requires pressing of two separate members simul-

taneously inside the lock case, by means of the invention inadvertent movement of the latch bolt into its outermost position can effectively be eliminated in practice.

- 5 The arrangement advantageously includes a control member dependent on the movement of the auxiliary bolt and arranged to control a turnable retaining member acting on the latch bolt. Then the control member may have a cam or the like, which is arranged in cooperation with a counter surface in the retaining member.

10

The lock case may with advantage include a counter member for the retaining member, which is arranged so that in the preventing position of the control member it prevents through the retaining member movement of the latch bolt into its outer protruding position.

15

In a favourable embodiment said force transmission means include a force transmission plate turnably journaled to the lock case and to which the control member and the retaining member are turnably journaled. In order to make the construction simpler the control member and the retaining member

20 have a common turning axis.

25

In the following the invention is described by way of example with reference to the attached drawing, the figures 1-4 of which show an embodiment of an arrangement according to the invention located in a door lock, in different operating positions of the members, viewed from the side and the door lock opened.

30

In the drawing 11 indicates a lock case of a door lock which is provided with a front plate 12 having an opening for a latch bolt 1 and for an auxiliary bolt 2. The latch bolt 1 is urged by means of a spring 10 in the direction outward from the lock case and correspondingly a spring 13 presses the auxiliary bolt 2 outward from the lock case. Retraction of the latch bolt 1 is provided from

an operation axis of the lock case in a way known as such (not shown more closely) by means of a force transmission plate 3 turnably journalled to the lock case 11.

- 5 The arrangement according to the invention controlling the protruding dimension of the latch bolt 1 includes a control member 4 which is turnable by means of the auxiliary bolt 2 around a pin 14 fixed to the force transmission plate 3. The arrangement includes also a retaining member 6 which is in co-  
operation on one hand with a pin 5 of the control member 4 through a coun-  
10 ter surface 6a in it and on the other hand with a counter member 9 through its cam 8. In addition there is a spring 7 arranged in the retaining member 6 and to which the control member 4 affects through the pin 5.

The situation of figure 1 corresponds to the open position of the door. The  
15 latch bolt 1 and the auxiliary bolt 2 are out urged by their respective springs 10 and 13. The latch bolt 1 is in its inner protruding position which allows in a way known as such closing of the door by pushing. The cam 8 of the retaining member 6 prevents together with the counter member 9 in the lock case movement of the latch bolt 1 into its outer protruding position. The aux-  
20 iliary bolt 2 for its part keeps the control member 4 in a position in which its pin 5 prevents through the counter surface 6a movement of the retaining member 6 upward in the figure into its releasing position.

In the situation of figure 2 the auxiliary bolt 2 is pressed into the lock case  
25 while the door is still open. Then the control member 4 turns in the counter clock-wise direction and the pin 5 in it moves upward and presses the spring 7 at the same time. The spring 7 tends to lift the retaining member 6 upward, but its cam 8 remains strictly in contact with the counter member 9, since the spring 10 of the latch bolt 1 presses the retaining member 6 to the  
30 left in the figure through the force transmission plate 3 and the pin 14. Thus the latch bolt 1 cannot be released to be moved into its outer protruding position merely by pressing the auxiliary bolt 2 into the lock case 11.

In the situation of figure 3 when the door is closed both the latch bolt 1 and the auxiliary bolt 2 are pressed into the lock case. Then the latch bolt 1 turns also the force transmission plate 3. As a consequence of this the control member 4 and the retaining member 6 move to the right in the figure. Now the contact of the cam 8 with the counter member 9 is detached. On the other hand at the same time when the latch bolt 1 and the auxiliary bolt 2 are pressed into the lock case also the control member 4 turns again in the counter clock-wise direction. In this situation when the pin 5 of the control member 4 moves upward it acts on the middle part of the spring 7 so that the spring 7 lifts the retaining member 6 into its releasing position in accordance with figure 3. The members being in this position the latch bolt 1 is allowed to move into its outer protruding position urged by the spring 10, which is disclosed in figure 4. Then the door is locked but the doorframe (not shown) prevents the auxiliary bolt 2 from moving out. However, the pin 5 keeps through the spring 7 the retaining member 6 in its releasing position.

In view of adapting the invention the force transmission plate 3 may be designed in different ways depending on whether or not it is intended to operate the latch bolt from two separate operation axes (as is the case with the solution of the figures) or only from one operation axis. Likewise the other members can be designed in different ways as required by the arrangement in each case.

Thus the invention is not limited to the embodiment shown but several modifications are feasible within the scope of the attached claims.

## CLAIMS

1. An arrangement in a door lock for controlling the extent of protrusion of a latch bolt (1) out from a lock case (11) of the door lock, said lock case (1) being provided with force transmission means for retracting the latch bolt (1) against the force of a spring (10) and with an auxiliary bolt (2) for controlling the operation of the latch bolt and in which the latch bolt (1) has at least two different protruding positions with different protruding dimensions, **characterized** in that it includes a control and retraction unit (4,6) which is arranged in cooperation with the latch bolt (1) and the auxiliary bolt (2) so that it allows movement of the latch bolt (1) into its outermost protruding position only in case both the latch bolt (1) and the auxiliary bolt (2) are first moved into their retracted position in the lock case (11).
2. An arrangement according to claim 1, **characterised** in that it includes a control member (4) dependent on the movement of the auxiliary bolt (2) and arranged to control a turnable retaining member (6) acting on the latch bolt (1).
3. An arrangement according to claim 2, **characterised** in that the control member (4) has a cam (5) or the like, which is arranged in cooperation with a counter surface (6a) in the retaining member (6).
4. An arrangement according to claim 2 or 3, **characterised** in that the lock case (11) includes a counter member (9) for the retaining member (6) which is arranged so that in the preventing position of the control member (4) it prevents through the retaining member (6) movement of the latch bolt (1) into its outer protruding position.
5. An arrangement according to any one of the claims 2-4, **characterised** in that said force transmission means include a force transmission plate (3)

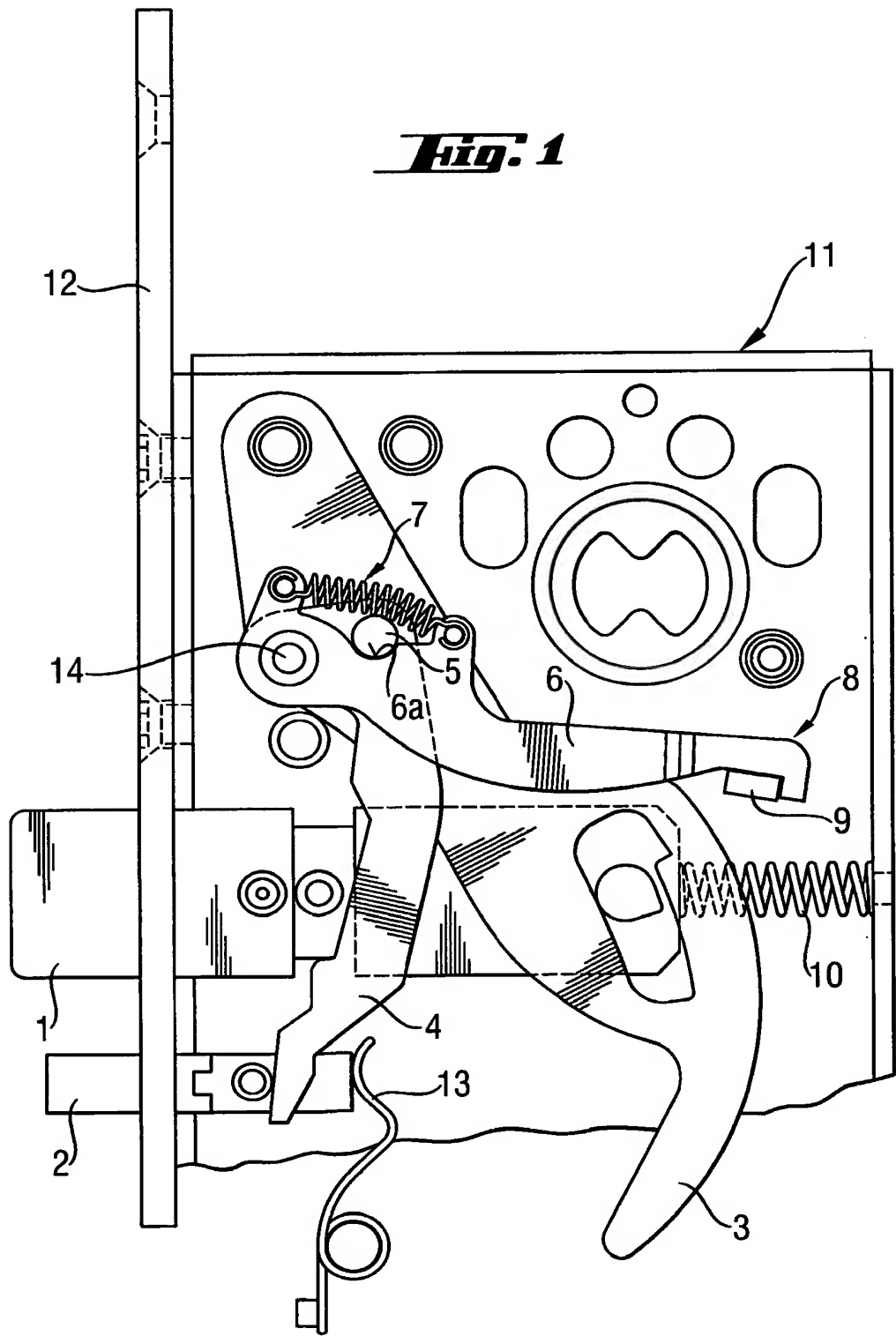
## 6

turnably journaled to the lock case and to which the control member (4) and the retaining member (6) are turnably journaled.

6. An arrangement according to claim 5, characterised in that the control  
5 member (4) and the retaining member (6) have a common turning axis (14).

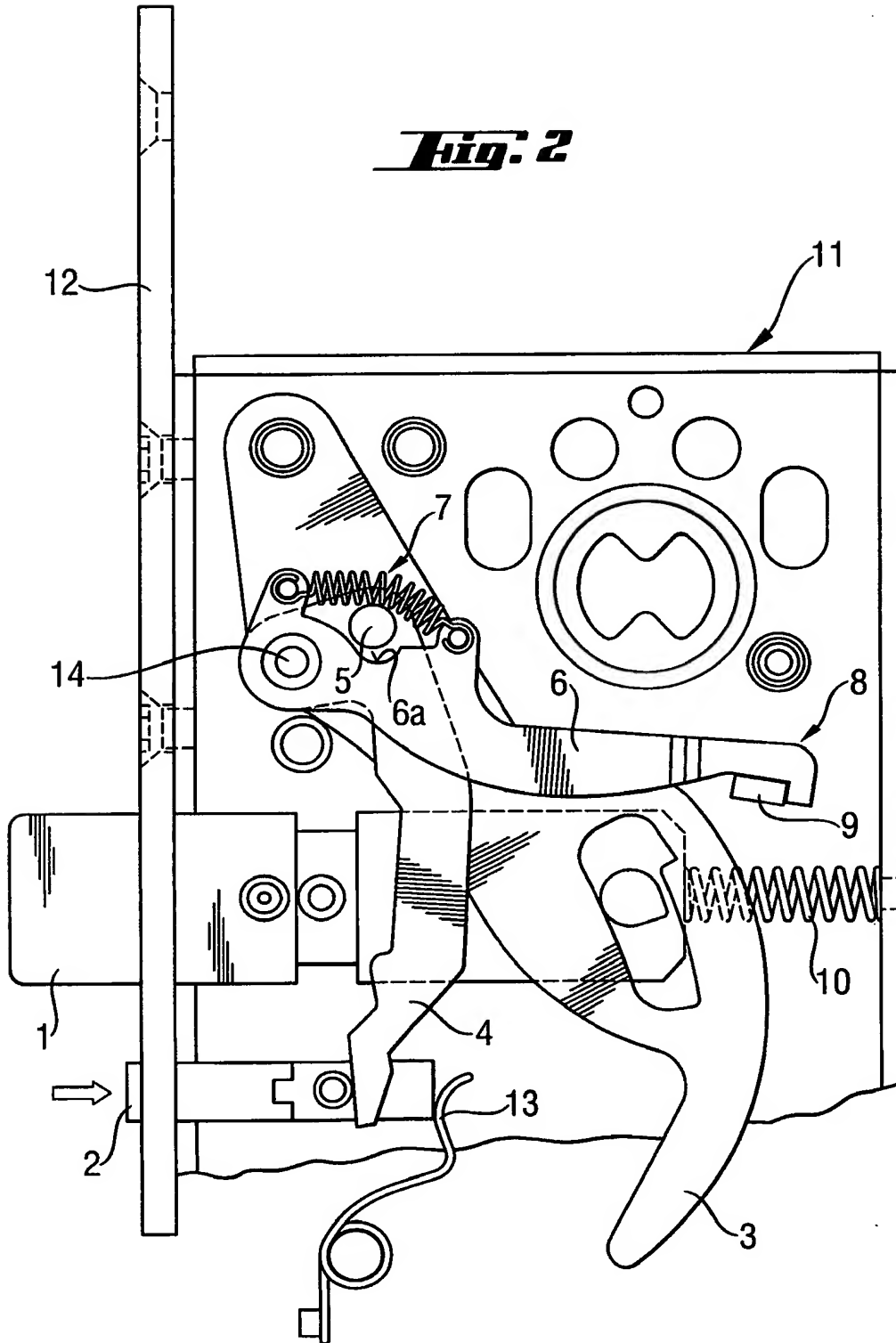


***Fig. 1***

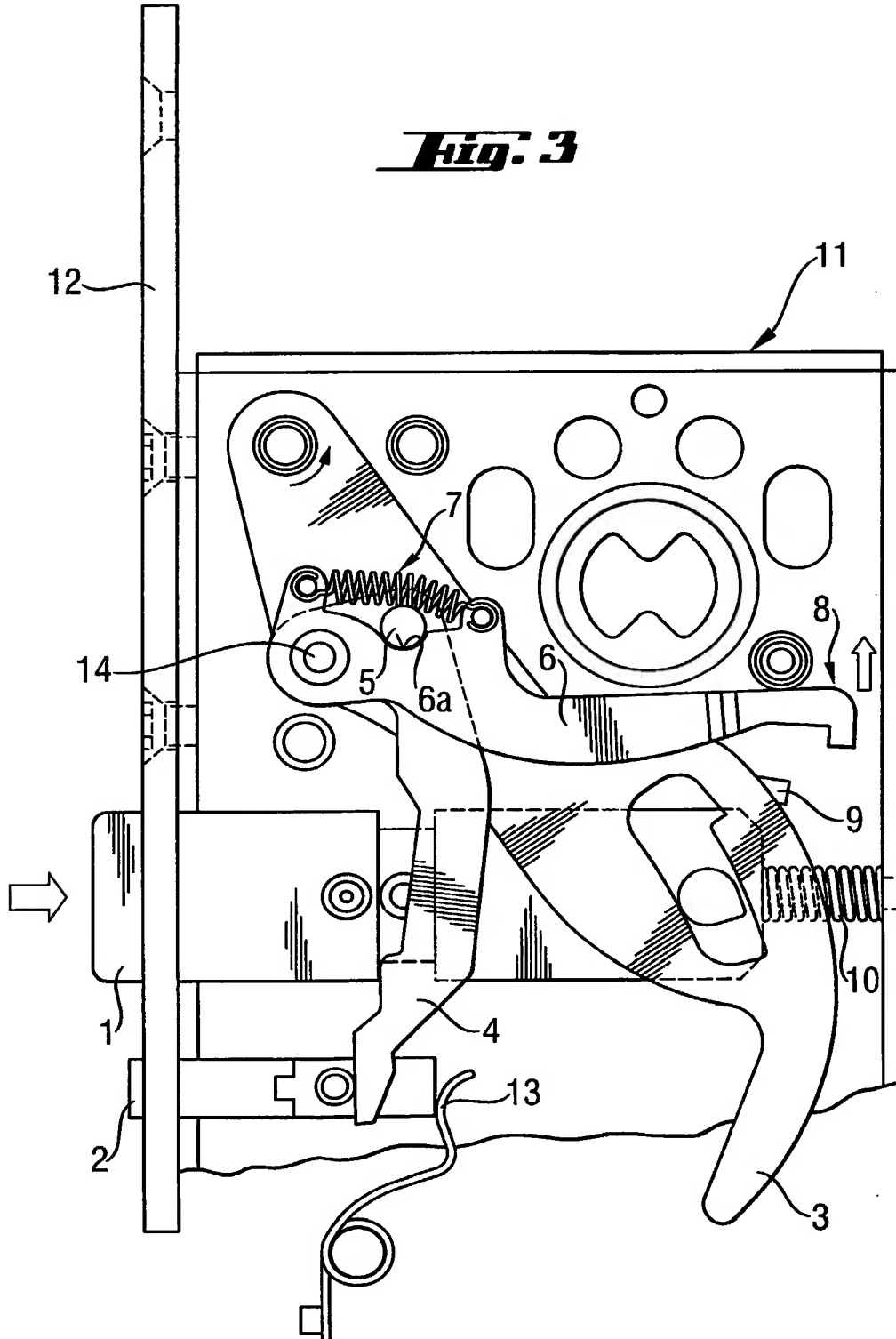


2 / 4

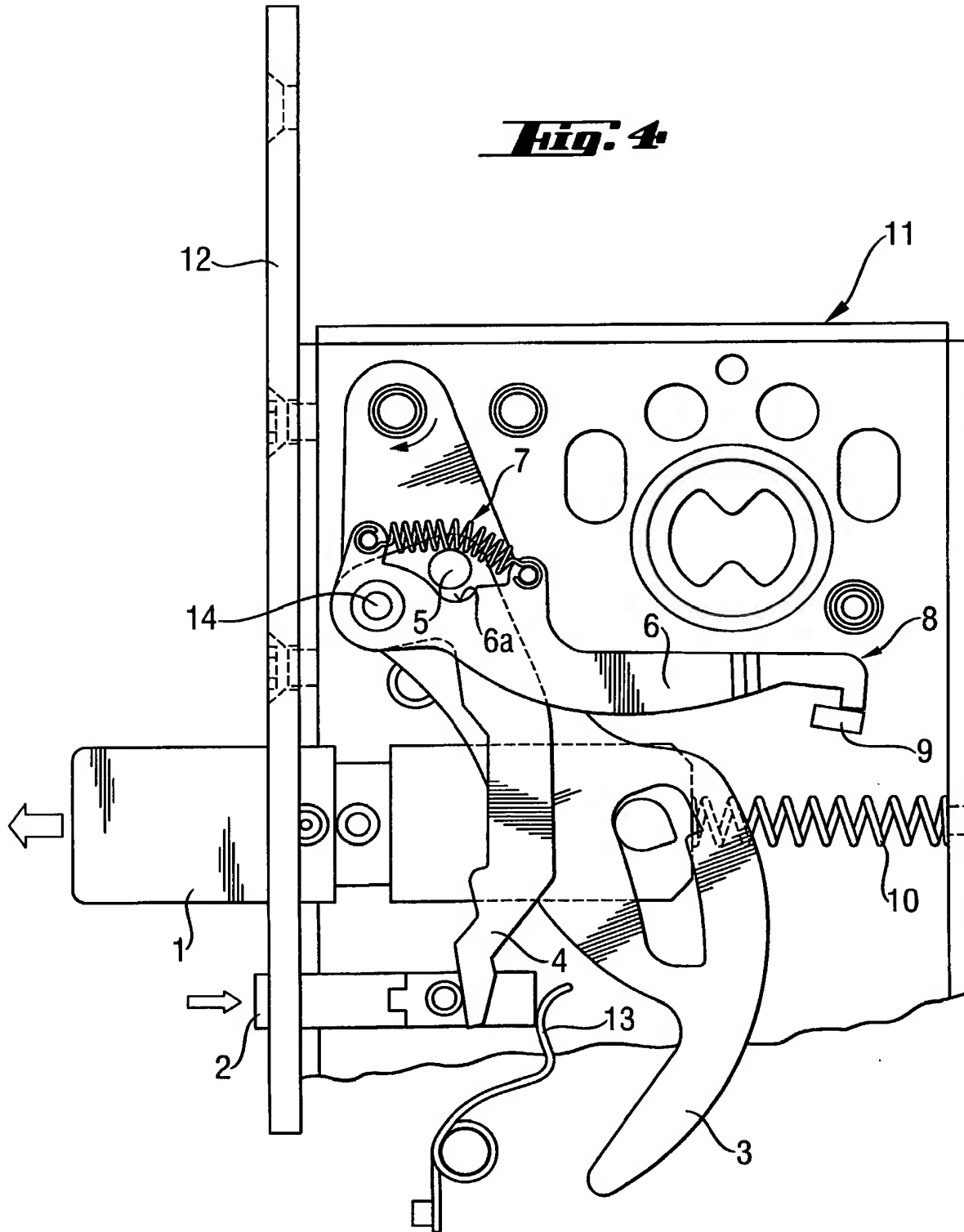
***Fig. 2***



3 / 4

***Fig. 3***

4 / 4



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 02/00039

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: E05B 63/20

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: E05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5044182 A (C.D. TOTTON), 3 Sept 1991 (03.09.91) --	1-4
A	US 6045169 A (G. FROLOV), 4 April 2000 (04.04.00) --	
A	US 5918916 A (P. KAJUCH), 6 July 1999 (06.07.99) --	
A	EP 0431369 A2 (BKS GMBH), 12 June 1991 (12.06.91) -- -----	

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

2 April 2002

Date of mailing of the international search report

19-04-2002

Name and mailing address of the ISA/

Swedish Patent Office

Box 5055, S-102 42 STOCKHOLM

Facsimile No. +46 8 666 02 86

Authorized officer

Christer Wendenius / MRo

Telephone No. +46 8 782 25 00

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

28/01/02

International application No.  
PCT/FI 02/00039

Patent document cited in search report			Publication date	Patent family member(s)		Publication date
US	5044182	A	03/09/91	NONE		
-----						
US	6045169	A	04/04/00	EP	0894176 A	03/02/99
				WO	9739214 A	23/10/97
-----						
US	5918916	A	06/07/99	AU	1348499 A	12/07/99
				WO	9932745 A	01/07/99
-----						
EP	0431369	A2	12/06/91	SE	0431369 T3	
				AT	105045 T	15/05/94
				DE	8914367 U	04/04/91
				DE	59005523 D	00/00/00
				ES	2051435 T	16/06/94
				PT	96086 A,B	30/09/92
-----						